

ARCHIVES OF

Biochemistry and Biophysics

Volume 280
1990



ACADEMIC PRESS, INC.
Harcourt Brace Jovanovich, Publishers

San Diego New York Boston
London Sydney Tokyo Toronto

Copyright © 1990 by Academic Press, Inc.

All Rights Reserved

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the copyright owner.

The appearance of the code at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use, or for the personal or internal use of specific clients. This consent is given on the condition, however, that the copier pay the stated per copy fee through the Copyright Clearance Center, Inc. (27 Congress Street, Salem, Massachusetts 01970), for copying beyond that permitted by Sections 107 or 108 of the U. S. Copyright Law. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale. Copy fees for pre-1990 articles are as shown on the article title pages; if no fee code appears on the title page, the copy fee is the same as for current articles.

0003-9861/90 \$3.00

MADE IN THE UNITED STATES OF AMERICA

This journal is printed on acid-free paper.



CONTENTS OF VOLUME 280

Number 1, July 1990

INVITED PAPER

- The Antioxidants of Human Extracellular Fluids *Barry Halliwell and John M. C. Gutteridge* 1

COMMUNICATIONS

- Effects of Domain-Specific Erythrocyte Membrane Modulators on Acetylcholinesterase and NADH:Cytochrome b_5 Reductase Activities *Donna A. Palmieri, Anuradha Rangachari, and D. Allan Butterfield* 224
- Identification of Cytochrome P450IA2 as a Human Autoantigen *Michael P. Manns, Keith J. Griffin, Linda C. Quattrochi, Michael Sacher, Heribert Thaler, Robert H. Tukey, and Eric F. Johnson* 229

BIOLOGICAL OXIDATIONS, BIOENERGETICS, AND P450 REACTIONS

- Generation and Recycling of Radicals from Phenolic Antioxidants *Valerian E. Kagan, Elena A. Serbinova, and Lester Packer* 33
- Redox and Spectral Properties of Flavodoxin from *Anabaena* 7120 *Kim E. Paulsen, Marian T. Stankovich, Brian J. Stockman, and John L. Markley* 68
- Regulation of the Mitochondrial Adenosine 5'-Triphosphatase *in Situ* during Ischemia and *in Vitro* in Intact and Sonicated Mitochondria from Slow and Fast Heart-Rate Hearts *William Rouslin and Charles W. Broge* 103
- Interaction with Cellular ATP Generating Pathways Mediates Menadione-Induced Cytotoxicity in Isolated Rat Hepatocytes *Frank A. M. Redegeld, Ralf M. W. Moison, Helma M. Barentsen, Andries Sj. Koster, and Jan Noordhoek* 130
- Intermembrane Transfer and Antioxidant Action of α -Tocopherol in Liposomes *V. E. Kagan, R. A. Bakalova, Zh. Zh. Zhelev, D. S. Rangelova, E. A. Serbinova, V. A. Tyurin, N. K. Denisova, and L. Packer* 147
- Changes of Some Physical Properties of Isolated and Purified Plasma and Thylakoid Membrane Vesicles from the Freshwater Cyanobacterium *Synechococcus* 6301 (*Anacystis nidulans*) during Adaptation to Salinity *M.-E. Rivière, B. Arrio, I. Steffan, V. Molitor, O. Kuntner, and G. A. Peschek* 159
- Tetrameric Manganese Superoxide Dismutases from Anaerobic *Actinomyces* *Katherine B. Barkley and Eugene M. Gregory* 192
- Inactivation of Lignin Peroxidase by Phenylhydrazine and Sodium Azide *Gia D. DePillis, Hiroyuki Wariishi, Michael H. Gold, and Paul R. Ortiz de Montellano* 217

ENZYME MECHANISMS AND METABOLIC REGULATION

- Benzoic Acid Inhibition of the α , β , and γ Isozymes of *Agaricus bisporus* Tyrosinase *Sunitha Menon, Robyn W. Fleck, Grace Yong, and Kenneth G. Strothkamp* 27
- Synthesis of Oxalyl Phosphate and Processing of the Acyl Phosphate by Phosphoenolpyruvate-Dependent Enzymes *James L. Kofron and George H. Reed* 40
- Glycosidases of Ehrlich Ascites Tumor Cells and Ascitic Fluid—Purification and Substrate Specificity of α -*N*-Acetylgalactosaminidase and α -Galactosidase: Comparison with Coffee Bean α -Galactosidase *Fumio Yagi, Allen E. Eckhardt, and Irwin J. Goldstein* 61
- Involvement of Membrane Charges in Constituting the Active Form of NADPH Oxidase in Guinea Pig Polymorphonuclear Leukocytes *Masaki Ozawa, Naoki Okamura, Mayumi Nakamura, and Sadahiko Ishibashi* 74

- Structure-Activity Studies of Fluoroketone Inhibitors of α -Lytic Protease and Human Leukocyte Elastase
Chandrika P. Govardhan and Robert H. Abeles 137
- The Medium-Chain Carnitine Acyltransferase Activity Associated with Rat Liver Microsomes Is Malonyl-CoA Sensitive
K. Lilly, G. E. Bugaisky, P. K. Umeda, and L. L. Bieber 167
- Escherichia coli* E-39 ADPglucose Synthetase Has Different Activation Kinetics from the Wild-Type Allosteric Enzyme
Alicia Gardiol and Jack Preiss 175
- Two Splenic Soluble Tyrosine Kinases from the Rat
Tadayoshi Hasuma, Akira Inoue, Youtaro Higashi, Seiji Morisawa, and Munehiko Yukioka 206

GENETIC STRUCTURE AND FUNCTION

- Enhancement by Theophylline of the Butyrate-Mediated Induction of Choriogonadotropin α -Subunit in HeLa Cells. I. Lack of Correlation with cAMP
Richard N. Tamura and G. Stanley Cox 87
- Enhancement by Theophylline of the Butyrate-Mediated Induction of Choriogonadotropin α -Subunit in HeLa Cells. II. Effect of Both Agents on mRNA Turnover
Dominic E. Cosgrove and G. Stanley Cox 95

GLYCOPROTEINS, GLYCOLIPIDS, AND EXTRACELLULAR MATRICES

- Transfection with Fragments of the Adenovirus 12 Gene Induces Tumorigenicity-Associated Alteration of N-Linked Sugar Chains in Rat Cells
Sen Hiraizumi, Seiichi Takasaki, Kazuko Shiroki, Naohisa Kochibe, and Akira Kobata 9
- Measurement of β -Galactosyltransferase Activity in Cell Extracts with an ELISA-Based Assay
Cheryl L. M. Stults and Bruce A. Macher 20
- Resolution of Phosphoglucosyltransferase and the 62-kDA Acceptor for the Glucosylphosphotransferase
Richard B. Marchase, Karen L. Richardson, Chantragan Srisomsap, Richard R. Drake, and Boyd E. Haley 122
- Further Studies on the Gangliosidic Nature of the Cholinergic-Specific Antigen, Chol-1
Attilia Giuliani, Emanuela Calappi, Edilio Borroni, Victor P. Whittaker, Sandro Sonnino, and Guido Tettamanti 211

LIPIDS AND LIPID MEDIATORS

- Peroxidative Modification of Phospholipids in Myocardial Membranes
Narasimham L. Parinandi, Barbara K. Weis, Viswanathan Natarajan, and Harald H. O. Schmid 45

MEMBRANE RECEPTORS, TRANSPORT, AND INTRACELLULAR SIGNALS

- Streptozotocin-Induced Alterations in the Levels of Functional Mitochondrial Anion Transport Proteins
Ronald S. Kaplan, Debra L. Oliveira, and Glenn L. Wilson 181
- Discrepancy of Protein Kinase C Translocation and Platelet Aggregation—Immunocytochemical Evidence
Masatoshi Hagiwara, Mariko Sumi, Nobuteru Usuda, Tetsuji Nagata, and Hiroyoshi Hidaka 203

PLANT MOLECULAR BIOLOGY, BIOCHEMISTRY, AND PHOTOSYNTHESIS

- Partial Characterization of Guard-Cell Phosphoenolpyruvate Carboxylase: Kinetic Datum Collection in Real Time from Single-Cell Activities
Mitchell C. Tarczynski and William H. Outlaw, Jr. 153

PROTEIN STRUCTURE AND FUNCTION

- Isolation and Characterization of Human HSP70 Expressed in *Escherichia coli*
D. Macejak, M. Rayfield, and R. Luftig 53
- Production of Recombinant Human Tropoelastin: Characterization and Demonstration of Immunologic and Chemotactic Activity
Zena Indik, William R. Abrams, Umberto Kucich, Carolyn W. Gibson, Robert P. Mecham, and Joel Rosenbloom 86

- Purification, Characterization, and Complete Amino Acid Sequence of a Thioredoxin from a Green Alga, *Chlamydomonas reinhardtii*
Paulette Decottignies, Jean-Marie Schmitter, Jean-Pierre Jacquot, Sophie Dutka, Alain Picaud, and Pierre Gadal 112

Number 2, August 1, 1990

INVITED PAPERS

- Cytochrome Oxidase: Some Unsolved Problems and Controversial Issues
Bo G. Malmström 233
- Cytochrome *c* Oxidases: Polypeptide Composition, Role of Subunits, and Location of Active Metal Centers
Angelo Azzi and Michele Müller 242
- Structure and Assembly of Cytochrome *c* Oxidase
Roderick A. Capaldi 252

COMMUNICATIONS

- Soluble and Membrane-Bound Forms of Cytochrome *b*₅ Are the Products of a Single Gene in Chicken
Hong Zhang and Chris Somerville 412
- Electron Paramagnetic Resonance Measurements of the Hydration of Mn(II) in Ternary Complexes with GDP and *ras* p21 Proteins
Geoffrey W. Smithers, Martin Poe, David G. Latwesen, and George H. Reed 416
- Kinetic Assembling of the Biologically Active Secondary Structure for CAR, the Target Sequence for the Rev Protein of HIV-1
Ariel Fernández 421

BIOLOGICAL OXIDATIONS, BIOENERGETICS, AND P450 REACTIONS

- Inhibition of Mitochondrial Respiration by Analogues of the Dopaminergic Neurotoxin 1-Methyl-4-phenylpyridinium: Structural Requirements for Accumulation-Dependent Enhanced Inhibitory Potency on Intact Mitochondria
Lawrence M. Sayre, Malvinder P. Singh, Pramod K. Arora, Fengjiang Wang, R. Jeff McPeak, and Charles L. Hoppel 274
- Multiplicity of Liver Microsomal Flavin-Containing Monooxygenase in the Guinea Pig: Its Purification and Characterization
Hideyuki Yamada, Koichiro Yuno, Kazuta Oguri, and Hidetoshi Yoshimura 305
- Effect of Divalent Cations on NADH-Dependent and NADPH-Dependent Cytochrome *b*₅ Reduction by Hepatic Microsomes
Minoru Tamura, Satoshi Yoshida, Tatsuko Tamura, Toshihito Saitoh, and Masazumi Takeshita 313

ENZYME MECHANISMS AND METABOLIC REGULATION

- Inhibition of Stress-Induced Gastric Mucosal Injury by a Long Acting Superoxide Dismutase that Circulates Bound to Albumin
Masahiko Hirota, Masayasu Inoue, Yukio Ando, and Yoshimasa Morino 269
- Pyruvate:NADP⁺ Oxidoreductase from *Euglena gracilis*: Mechanism of O₂-Inactivation of the Enzyme and Its Stability in the Aerobe
Hiroshi Inui, Kazutaka Miyatake, Yoshihisa Nakano, and Shozaburo Kitaoka 292
- Separation of Ca²⁺-ATPase from Mg²⁺-ATPase in Plasma Membrane-Rich Fraction of Bovine Parotid Gland
Ritsuko Matsukawa 362
- Purification and Properties of Mitochondrial Phosphoenolpyruvate Carboxykinase from Liver of *Squalus acanthias*
Warren V. Johnson, Jon R. Kemp, and Paul M. Anderson 376
- Effect of Insulin-like Growth Factor I on Rat Alcohol Dehydrogenase in Primary Hepatocyte Culture
Esteban Mezey, James J. Potter, Lopa Mishra, Savitri Sharma, and Michel Janicot 390
- Potent Peptide Inhibitors of Smooth Muscle Myosin Light Chain Kinase: Mapping of the Pseudosubstrate and Calmodulin Binding Domains
Carolyn J. Foster, Shona A. Johnston, Brooks Sunday, and Federico C. A. Gaeta 397

MEMBRANE RECEPTORS, TRANSPORT, AND INTRACELLULAR SIGNALS

- Extracellular ATP Stimulates an Amiloride-Sensitive Sodium Influx in Human Lymphocytes
J. S. Wiley, G. P. Jamieson, W. Mayger, E. J. Cragoe, Jr., and M. Jopson 26
- Purification and Identification of a Cytosolic Factor Required for Import of Precursors of Mitochondrial Proteins into Mitochondria
Hideyu Ono and Syozo Tuboi 29
- Reassociation of Deoxyribonuclease II with the Lysosomal Membrane Isolated from Porcine Spleen
Hui-Chen Chang and Ta-Hsiu Liao 32
- Immunocytochemical Studies on the Localization of 5-Aminolevulinate Synthase in Rat Liver
Manfred Rohde, Gopesh Srivastava, Dennis B. Rylatt, Peter Bundesen, Jane Zamattia, Denis I. Crane, and Brian K. May 33
- Possible Involvement of Arachidonic Acid Metabolites of Cytochrome P450 Monooxygenase Pathway in Vaso-pressin-Stimulated Glycogenolysis in Isolated Rat Hepatocytes
Setsuko Yoshida, Aizan Hirai, Yasushi Tamura, and Sho Yoshida 34
- Thiamine Pyrophosphate Uptake into Isolated Rat Liver Mitochondria
Maria Barile, Salvatore Passarella, and Ernesto Quagliariello 35
- Immunoaffinity Purification of Type I Protein Kinase C
Takahisa Hachiya, Masatoshi Hagiwara, and Hiroyoshi Hidaka 35
- The Effect of Adriamycin and Duramycin on Calcium Translocation in Liposome Systems Modeled on the Inner Mitochondrial Membrane
Mary Beth Kester and Patricia M. Sokolove 40

PHYSICAL BIOCHEMISTRY

- ^1H , ^{13}C , and ^{31}P Nuclear Magnetic Resonance Spectral Assignments for Tobramycin, 2''-(Adenosine-5'-phosphoryl)-tobramycin and 2''-(Adenosine-5'-thiophosphoryl)-tobramycin
Jean E. Van Pelt, Ed S. Mooberry, and Perry A. Frey 28
- An Improved Method for the Purification of Myrosinase and Its Physicochemical Characterization
Antonio Pessina, Richard M. Thomas, Sandro Palmieri, and Pier Luigi Luisi 38

PLANT MOLECULAR BIOLOGY, BIOCHEMISTRY, AND PHOTOSYNTHESIS

- Effects of the Photobleaching Herbicide, Acifluorfen-methyl, on Protoporphyrinogen Oxidation in Barley Organelles, Soybean Root Mitochondria, Soybean Root Nodules, and Bacteria
Judith M. Jacobs, Nicholas J. Jacobs, Susan E. Borotz, and Mary Lou Guerinot 36

PROTEIN STRUCTURE AND FUNCTION

- Immunoaffinity Purification of Human Thromboxane Synthase
R. Nüsing, S. Schneider-Voss, and V. Ullrich 32
- Escherichia coli* β -Hydroxydecanoyl Thioester Dehydrase Reacts with Native C_{10} Acyl-Acyl-Carrier Proteins of Plant and Bacterial Origin
Daniel J. Guerra and John A. Browse 33
- AUTHOR INDEX FOR VOLUME 280 42

NOTICE

The Subject Index for Volume 280 will appear in the December 1990 issue as part of a cumulative index for the year 1990.

Archives of Biochemistry and Biophysics is an international journal dedicated to the dissemination of fundamental knowledge in all areas of biochemistry and biophysics. **Short Communications** and **regular manuscripts** that contain new and significant information of general interest to workers in these fields are welcome. Sufficient detail must be included to enable others to repeat the work.

Short Communications offer a means of early publication of work of such importance that rapid publication is warranted. They should not exceed 15 double-spaced typed manuscript pages in length (including text, bibliography, tables, and figures). To expedite review and processing of communications, authors may send them directly to an Executive Editor most closely associated with the subject category of the communication. Communications sent to the Editorial Offices of the journal (see below) will be assigned to an Executive Editor.

Manuscripts should be written in clear, concise, and grammatical English and should be submitted in quadruplicate (one original and three photocopies), including four sets of original figures or good quality glossy prints, to:

Archives of Biochemistry and Biophysics

Editorial Office
Seventh Floor
1250 Sixth Avenue
San Diego, California 92101

Failure to receive the required number of copies of the manuscript may delay review. All copies of halftone artwork *must* be glossy prints or originals; photocopies of halftones do not show sufficient detail to be used for the review process. *In the case of rejected manuscripts only one copy of the manuscript will be returned to the author.*

Gene sequences should be simultaneously submitted to a gene databank. Authors of papers describing new structure determinations are requested to submit to the Protein Data Bank all of the structural data required to validate the discussion, including both x-ray amplitudes and phases and the advised atomic coordinates.

Original papers only will be considered. ***Manuscripts are accepted for review with the understanding that the same work has not been published, that it is not under consideration for publication elsewhere, and that its submission for publication has been approved by all***

of the authors and by the institution where the work was carried out. It is the responsibility of the corresponding author to obtain the agreement of all the co-authors of the manuscript prior to its submission to the journal. Abstracts of oral or poster presentations are not considered to constitute previous publication. Presentation of material in preliminary communications normally will not preclude publication of a full paper in *Archives*, provided that the full paper contains additional information that justifies its publication and does not repeat the presentation of the same data that supported the preliminary communication. The manuscript should be accompanied by copies of all preliminary communications and of all relevant manuscripts that are in press or under editorial consideration by another journal. Authors must verify the wording of any cited personal communication with the persons who supplied the information and obtain approval for the use of their names in connection with the quoted information or for the citation of unpublished work; written evidence of such approval should accompany the manuscript. All material published in *Archives* represents the opinions of the authors and should not be construed to reflect the opinions of the Editors or the Publisher.

Authors should suggest competent reviewers in their field and may also suggest individuals whom they wish to have excluded from the review process. The corresponding author will receive a decision letter from the Executive Editor. Revised manuscripts and correspondence concerning such manuscripts should be sent to the Executive Editor at the address indicated on the decision letter. Revised manuscripts should be accompanied by a copy of the unrevised version.

Many acceptable papers require minor revision or condensation. It is in the mutual interest of both the authors and the journal that amended manuscripts be returned promptly. A revised paper will retain its original date of receipt only if it is received by the Executive Editor within 2 months of the date of return to the author.

Authors submitting a manuscript do so on the understanding that if it is accepted for publication, copyright in the article, including the right to reproduce the article in all forms and media, shall be assigned exclusively to the Publisher. The Publisher will not refuse any reasonable request by the author for permission to reproduce any of his or her contributions to the journal.

Form of manuscript. Manuscripts should be typewritten and double-spaced throughout on one side of 8.5 × 11-in. white paper, with 1-in. margins on all sides. All pages should be numbered consecutively.

Subject Areas. Authors should specify on page 1 of the manuscript the Subject Area of the article submitted:

Biological Oxidations, Bioenergetics, and P450 Reactions
Enzyme Mechanisms and Metabolic Regulation

¹ An extended Instructions to Authors is published in the January issue of *Archives of Biochemistry and Biophysics*. Reprints are available from the Editorial Office upon request. Authors should consult the extended Instructions for details on nomenclature, IUPAC-IUB rules and recommendations, and accepted abbreviations.

Genetic Structure and Function
Glycoproteins, Glycolipids, and Extracellular Matrices
Lipids and Lipid Mediators
Membrane Receptors, Transport, and Intracellular Signals
Physical Biochemistry
Plant Molecular Biology, Biochemistry and Photosynthesis
Proteases, Protein Turnover, and Post-translational Processing
Protein Structure and Function

Page 1 should contain the article title, author(s), affiliation(s), a short running title (abbreviated form of title) of less than 65 characters including letters and spaces, the appropriate subject category for listing in the Table of Contents, suggestions for index list entries, and the name and complete mailing address (and telephone number if possible) of the person to whom correspondence should be sent.

Page 2 should contain a short abstract of 50–250 words.

Editorial style should conform to the *Handbook for Authors* (American Chemical Society).

Footnotes to the text should be identified by superscript Arabic numerals and should be typed double-spaced on a separate sheet; footnotes to tables should be identified by superscript lowercase italic letters (^{a,b}, etc.) and placed at the bottom of the table.

Tables should be numbered with Roman numerals and cited consecutively in the text. Each table should be titled and typed double-spaced on a separate sheet. Units must be clearly indicated for each of the entries in the table.

Authors can submit complex tables and mathematical material as camera-ready copy. In this way, they are spared multiple, tedious proofreadings and the chance of error is reduced. Tables submitted as camera-ready copy should be typed single-spaced whenever possible and preferably submitted as 5 × 7-in. glossy prints.

Figures should be cited consecutively in the text by Arabic numerals. Legends should be typed double-spaced on a separate sheet. All figures and illustrations are to be submitted in such form as to permit photographic reproduction without retouching or redrawing. They should be planned to fit the proportion of the printed page ($7\frac{1}{8} \times 9$ in.; column width, 3.5 in.) and submitted no larger than 8.5 × 11 in. Lettering on drawings should be of professional quality or generated by

high-resolution computer graphics and should be large enough (10–12 points) to take a reduction of 50–60%. Drawings should be made with black India ink on tracing linen, smooth-surface white paper, or Bristol board. Alternatively, high-quality computer graphics may be acceptable. Graph paper, if used, should be ruled in blue. Glossy prints of figures properly prepared are acceptable. Illustrations in color can be accepted only if the authors defray the cost.

References should be cited in the text by an Arabic numeral in parentheses and listed at the end of the paper in numerical order typed double-spaced on a separate sheet. Abbreviations of journal titles should conform to those of *Chemical Abstracts Service Source Index*, 1985. Please note the following examples.

1. Webster, K. D., and Anders, M. W. (1989) *Arch. Biochem. Biophys.* **273**, 562–571.
2. Stein, W. D. (1986) *Transport and Diffusion across Cell Membranes*, Academic Press, San Diego.
3. Magnani, J. L., Spitalnik, S. L., and Ginsburg, V. (1987) in *Methods in Enzymology* (Ginsburg, V., Ed.), Vol. 138, pp. 195–207, Academic Press, San Diego.

Miniprint supplements are an effective way of presenting supportive data. They are printed from plates made by photographic reduction from typed pages provided by the author. Types of data that have been published as miniprint supplements include analyses relevant to studies of amino acid or polynucleotide sequences, details of chemical syntheses, preparation of enzymes, extended statistical or mathematical discussions, and X-ray diffraction data. The miniprint supplement is published in the journal, immediately following the parent paper, and is included in the reprints. Since the miniprint supplement is produced from camera-ready copy supplied by the authors with no redaction or editorial changes it is important that the copy be letter perfect and conform to the style of the journal. *Authors will not be permitted to make changes to the miniprint supplement at the proof stage. Any changes necessary in the proof must be made as a typeset "Note added in proof."*

Proofs will be sent to the author, with a reprint order form. Authors will be charged for extensive alterations.

Reprints. Fifty reprints of each article will be provided free of charge. Additional reprints may be purchased.



Protein Expression and Purification

Editor-in-Chief

Owen W. Griffith

Cornell University Medical College, New York

Executive Editors

Shelby L. Berger, National Institutes of Health, Bethesda, Maryland

Loran L. Bieber, Michigan State University, East Lansing, Michigan

Richard R. Burgess, University of Wisconsin, Madison

William B. Jakoby, National Institutes of Health, Bethesda, Maryland

Paula Traktman, Cornell University Medical College, New York City

Protein Expression and Purification is a new international journal that will publish original articles reporting novel or significantly improved isolations of proteins in highly purified form. In addition to articles describing the purification of specific proteins directly from conventional sources, the journal will publish procedures for the expression and isolation of proteins from genetically engineered sources. Articles presenting novel or improved molecular biological methodologies for the overexpression of specific proteins are also within the scope of the journal.

The journal will solicit and publish review articles describing and evaluating important issues in the expression and purification of proteins. **Protein Expression and Purification** will be a valuable resource for investigators interested in protein chemistry, enzymology, or the molecular biology of protein expression.

Accepting Manuscripts on:

The preparation of natural and recombinant proteins

- Achievement of a high level of purity
- Expression of active recombinant proteins
- Production of mutant proteins

Techniques for protein expression

- Control of stability, solubility, and activity
- Gene constructions designed to facilitate purification
- Vectors and hosts

Manuscript submission

Please submit manuscripts, in quadruplicate, to:

Protein Expression and Purification

Editorial Office

1250 Sixth Avenue

San Diego, CA 92101

Volume 1 (1990), 2 issues

ISSN 1046-5928

In the U.S.A. and Canada: \$70.00

All other countries: \$80.00

Sample copies and privileged personal rates are available upon request. For more information, please write or call:



Academic Press, Inc.
Journal Promotion
Department
1250 Sixth Avenue
San Diego, CA 92101
U.S.A.
(619) 699-6742

All prices are in U.S. dollars and are subject to change without notice.

